

Michigan to Kansas. At midnight the area had divided into two parts. The eastern portion moved northeastward into Canada, while the western part continued with decreasing pressure nearly stationary in the Lower Missouri valley until the morning of the 18th, when Omaha barometer was 0.41 below the normal. Moving thence in a nearly northeasterly course it was central the morning of the 19th in Minnesota. By the morning of the 20th had passed into Manitoba. Its subsequent course was too far northward of our stations to permit of accurate charting, but apparently it reached Ontario in an easterly course by the morning of the 21st, and during that day moved down the Gulf of St. Lawrence. During the night of the 18th and 19th, brisk winds were reported from scattering stations in the Upper Lake region; the highest being 32 miles at Milwaukee. On the afternoon of the 20th, brisk or high winds were reported from every station in the Upper Lake region; maximum velocities ranging from SE. 22 at Chicago to SW. 44 at Milwaukee. Cautionary Signals were ordered on the afternoon of the 20th for the entire Lake region, except Lake Ontario. These signals were late for the Upper Lake region. On the morning of the 21st, signals on Lakes Michigan and Superior, and at midnight on the other Lakes, were lowered. The following maximum velocities were reported: Marquette, Cleveland and Sandusky, W. 26 miles; Alpena, W. 29; Grand Haven, SW. 34; Buffalo, SW. 36. On the Atlantic coast Off-shore Signals were hoisted at midnight of the 20th from Chincoteague northward to Sandy Hook and were lowered at noon of the 22nd. The following maximum velocities were reported: Delaware Breakwater, SW. 28 miles; Cape May, NW. 30.

No. IX.—On the 21st the barometer fell sharply in the North Pacific coast region and on the morning of the 22nd the lowest pressure was at Olympia, 0.25 below the normal. Moving nearly southeastward the area was central during the morning of the 23rd in Montana and at midnight in southern Dakota. Changing its course to the northeast the central area reached Minnesota at midnight of the 24th, and during the 25th passed northeastward over Lake Superior into Canada. On the afternoon of the 24th Cautionary Signals were ordered for Lake Superior and the northern half of Lake Michigan. These signals fully justified—except at Duluth—remained displayed for advancing low area No. X until the 26th.

No. X.—This area apparently sprang up from remains of low area No. IX. The morning of the 25th the lowest pressure was at Dodge City, 0.32 below the normal. Moving northeastward the area was central in Iowa at midnight, and on the following morning in Wisconsin; Milwaukee barometer 0.42 below the normal. Continuing its northeastward course the centre reached Ontario at midnight; Rock-liffe barometer 0.46 below the normal. The afternoon of the 25th Cautionary Signals were ordered for Chicago, and the signals displayed on Lakes Michigan and Superior were continued. During the 26th Cautionary Signals were ordered for the rest of the Lake region. These signals were lowered on Lakes Michigan and Superior at midnight of the 26th and in the rest of the Lake region during the following day. These signals were somewhat late for Lake Erie. The following maximum velocities were reported: Toledo, W. 25 miles; Cleveland, S. 26; Marquette, W. 28; Escanaba and Milwaukee, N. 38; Grand Haven, SW. 24.

No. XI.—During the 27th the trough of low pressure—an off-shoot of low area No. X—covered the Blue Ridge and Cumberland Mountains and at midnight was central in West Virginia; Lynchburg barometer 0.33 below the normal. Moving northeastward the area was central the morning of the 28th, with high pressure, in Pennsylvania; Philadelphia barometer 0.47 below the normal. On that afternoon the lowest pressure was over New Hampshire; Boston and Portland barometers 0.48 below the normal. At that time the wind on Mt. Washington was S. 66 miles, having changed that morning from northwest—its normal direction—to south. By midnight the storm-centre had passed northward to the valley of the St. Lawrence; Father Point barometer 0.59 below the normal. On the morning of the 28th Off-shore Signals were ordered from Chincoteague to Sandy Hook, and were lowered on the afternoon of the 28th. The following maximum velocities were reported: Sandy Hook, W. 29 miles; Chincoteague, SW. 30; Delaware Breakwater, W. 33; Cape May, W. 34.

No. XII.—This area apparently developed in Saskatchewan during the 26th, and moving south-eastward was central midnight of 27th in Minnesota; Duluth barometer 0.30 below the normal. Moving slowly eastward over Lake Superior it was central, with decreased pressure, at midnight of the 28th over Lake Ontario; Parry Sound barometer 0.49 below the normal. During the day (28th) rain and sleet, severe squalls, high seas and rough weather prevailed on Lakes Erie and Ontario. During the 29th the centre moved northeastward into Canada, while brisk westerly winds, in connection with high area No. VI, prevailed on all the Lakes, except Superior. At midnight of the 28th Cautionary Signals were ordered for Lake Ontario and the eastern half of Lake Erie, and were lowered on the morning of the 30th. The following maximum velocities were reported; Buffalo, W. 28 miles; Cleveland, W. 29; and Erie, W. 30.

No. XIII.—During the 29th the barometer fell rapidly in the extreme Northwest, and on the afternoon of the 30th the barometer at Yaukton was 0.12 below the normal. At midnight of the 30th the lowest pressures were at Omaha and Dodge City, 0.12 below the normal.

## INTERNATIONAL METEOROLOGY.

Three International charts, Nos. IV, V and VI, accompany the present Review. They are for the months of *August, 1880* and *January, 1879*.

On chart No. IV. are shown, as well as is at present possible, the tracks of storm-centres over the North Atlantic and adjacent land areas, during the month of *August*, 1880. Five of them are tropical cyclones, three of which, Nos. IV, VI and IX, were described in the August REVIEW. No. X was experienced in 21° N., 46° W., by Brig. *Dorotea* on the 26th and 27th of August, but the report of this storm is somewhat doubtful. If, however, it should be sustained by other reports, it may possibly be the same area as No. XIII, which passed over the Bermudas during the night of August 29th, 1880, and compares in severity with the hurricanes of 1839 and 1878. As will be seen by the track on chart No. IV these islands were only a short distance from the centre of the hurricane during its curvature towards the north and northeast. The following accounts of this storm will indicate its general features: Brig. *Lorne*, from Halifax to Jamaica, on August 28th had squally weather, with heavy sea-swell from the eastward; on the 29th, 8 a. m., fresh ENE. breeze; at noon, in 32° 40' N., 62° 40' W., hurricane commenced from NNE.; 2 p. m., hurricane increased rapidly, with a tremendous sea, and at 4 p. m., shifted to NNW., throwing the vessel on her beam ends; 30th, gale moderated. At the *Bermudas*, the following observations were made. Commencing at the southern extremity, we have the following record, by Mr. J. Perinchief, of observations made at *Gibbs' Hill* Light station (elevation of barometer above sea, 246 feet): August 29th, a. m., very threatening, sea rising with long heavy swells, wind steadily increasing from NNE., barometer falling; noon, barometer 29.920, wind NNE. (force 6) increasing, very heavy clouds from NE. and E., with distant thunder, sea very rough and breaking heavily; 3 p. m., NNE. increasing, heavy looking weather to the eastward; 5 p. m., NNE., barometer 29.790; 6:30 p. m., very stormy looking, wind backing, barometer 29.730; about this time, the storm was thought to be passing to the westward, but at 10 p. m., the wind was NW., heavy gale, barometer 29.500; and near midnight, NW., hurricane, barometer 29.240, "vibration (of light house), and howling of the storm was fearful;" at 1 a. m. of the 30th, the barometer reached the lowest point, 29.140; 2 a. m., storm fearful; 3 a. m., wind more to westward, storm lulled a little; 6 a. m., barometer 29.170; barometer continued to rise during the morning and the wind to back to SW; noon, barometer 29.550, SW. strong gale, force 9, rain, storm passed off to the northwest. *Hamilton* (aneroid barometer), 29th, during morning, wind NE.; 4 p. m., drifting rain; 6 p. m., barometer 30.00; 10 p. m., wind NE. in very heavy gusts; 11:30 p. m., 29.45; 30th, 1.50 a. m., 29.28; 2 to 4 a. m., highest winds; 3 a. m., lowest barometer, 29.24; 4 a. m., barometer 29.35 rising, wind veered to SW. and continued in that quarter all day, with heavy seas and "sheets of rain;" 7 a. m., barometer 29.60; 2 p. m., 29.80. *Nonsuch Island*, 29th, 7 p. m., NE. gale set in; 30th, 2 a. m., wind drawing to NW. with some force; "felt several earthquake shocks." *St. David's Island* (Mount Hill Lighthouse), 29th, morning, cloudy; noon, wind E., threatening; 4 p. m., NE., squally, fine rain, heavy sea rolling in from eastward; 8 p. m., gale gradually backing to N.; where it remained until midnight, when it increased to a hurricane; 30th, 1.45 a. m., wind shifted in tremendous squall from N. to NW.; 3.30 to 3.45 a. m., "wind again shifted in a more tremendous squall, accompanied by the sound of an earthquake or tornado from NW. to SW.;" 4 a. m., wind abating slightly, but still blowing very hard with heavy rain; 4 p. m., bright spots in sky to west—storm breaking; "the true hurricane was from midnight of the 29th to 4 a. m. of the 30th." Much injury to buildings, trees and small sailing craft resulted, but was mostly confined to the northeastern portions of the Islands. The following valuable report of the S. S. *Bermuda*, from New York, August 24th, deserves special attention: August 29th, 12 a. m., barometer 30.45; 4 a. m., 30.44; 8 a. m., 30.40; noon, 33° 20' N, 66° 15' W, barometer 30.37, weather fine and clear; 3 p. m. heavy gray cumuli rising to SE., wind NNE. rapidly increasing, prepared vessel for storm; 4 p. m., 30.28, wind increasing and sky covered with hard looking cumuli; 8 p. m., 30.22, barometer rapidly falling, NNE gale, occasional showers; estimated position of vessel about 23 miles NW. by W. of *North Rock*, Bermudas, and hauled ship off to the northward for one hour; 9 p. m., N. moderate gale; midnight, 30.04, N. violent gale, constantly backing westerly; 30th, 4 a. m., barometer 29.82 rapidly falling, wind NW.; 6 a. m., perfect hurricane, wind still backing, heading ship to north; 8 a. m., 29.64 falling rapidly; noon, 29.40, full hurricane; 2 p. m., 29.32 stationary; 3 p. m., barometer rising; 4 p. m., 29.34, SW., storm apparently abating; 5 p. m., suddenly *calm*, weather clearing slightly, "sea and sky entirely ablaze with a lurid yellow and greenish glare, having a most unearthly and terrifying appearance;" 5:20 p. m., hurricane burst upon us with redoubled violence from SSW., barometer falling fast; 8 p. m., 29.10, "ship buried on port side from sheer force of wind, atmosphere one mass of flying water—every thing blown away;" midnight, lowest barometric reading 28.85; 31st, 4 a. m., barometer rising, wind abating slightly; 6 a. m., 29.00; 8 a. m., 29.18; 10 a. m., 29.40; noon, 29.64, weather moderating, gusts of hurricane violence with very heavy rain; 4 p. m., WSW., moderating; 8 p. m., position (estimated) about 45 miles northeast of St. David's Head, wind W., sea gone down, day ends fine and clear; September 1st, 7:30 a. m.,—N. 63° 08' W. or about 72 miles east of St. David's Head, NW. breeze, easterly swell; 10:30 a. m., steering west; noon, 33° 11' N. 63° 23' W. Barque *Eliza Burns*, August 29th, morning, 36° 3' N. 68° 9' W., quite calm; 2 p. m., NW., light breeze gradually hauling to NE; 30th, 6 a. m., 34° 40' N. 66° 50' W., NE. moderate, fine and clear; 9 a. m., barometer 29.90 falling, SE squall; noon, 29.85, NE. increasing; light rain squalls; 6 p. m., 29.85, very heavy SE. swell; 8 p. m., 29.60, wind commenced to back and blow harder, rain squalls; 9 p. m., 29.58, NNW; midnight, 29.60, NW; 31st, 2 a. m., 29.65; 6 a. m., 29.70, WNW., sky very clear to westward, but hard ugly looking clouds to northeast; 8 a. m., wind

W; noon, Bermuda, bearing ESE. Brig *Twilight* left Shelbourne, N. S., August 27th bound to Trinidad, Jamaica, on August 31st, in  $38^{\circ} 26' N. 62^{\circ} 05' W.$ , had fresh gale from N. veering to SE., heavy sea from SSW. increasing with every indication of approaching hurricane: September 1st, ENE., increasing with very heavy sea; 2nd, NNE. hurricane, vessel on beam ends, decks swept; 10 p. m., cut away foremast; 11 p. m.,  $35^{\circ} 06' N. 60^{\circ} 15' W.$ ; 3rd, NNE., "blowing terrific;" 2 a. m. moderated; 3 a. m., wind hauled to SE. men lashed to deck; midnight, gale abated; 4th, SW. light breeze, fine weather. In regard to the storm areas located between the 45th and 55th parallels little requires to be said, except that they were probably accompanied by somewhat higher winds than those of the preceding month of July. In general, however, the weather over this portion of the ocean continued fair throughout most of the month. Severe storms, however, were experienced more to the northward near the 60th parallel, and, in the vicinity of the Straits of Davis and Belle Isle, by schooner *Delia Hodgkins* and steamer *Gulnare*, the former vessel, in sailing from  $63^{\circ} 30' N., 35^{\circ} W.$  on August 1st to the Straits of Belle Isle on the 25th, reporting no less than seven barometric minima, with winds on the 5th, 13th, 17th and 28th, of force 8 and 9. The only severe winds reported between the 45th and 55th parallels accompanied the storm traced as No. V and are as follows:—Bark *Ivigtut*, August 11th,  $43^{\circ} N., 59^{\circ} W.$ , 8 p. m. to 11:30 p. m., thunderstorm working from W. to E.; at 9:30 p. m. a strong squall of force 8. S. S. *Pennsylvania*, August 12th,  $42^{\circ} N., 45^{\circ} W.$ , barometer 29.94, wind SW. force 8, heavy rain and SW. sea. S. S. *Scythia*, August 12th, about 9:30 a. m., ship's time,  $47^{\circ} N. 36^{\circ} W.$ , barometer 30.12, SSW., force 4; 4 p. m., 30.05, SW., moderate breezes, with heavy, gloomy and cloudy weather; 7 p. m. 29.75, wind and sea increasing; 8 p. m., 29.55, SW. fresh gale, very hard squalls and heavy rising sea running NNE., barometer falling; 9:15 p. m., very heavy rain, wind suddenly shifted to NW., barometer indicating a rise; 10 p. m., 29.80, wind and sea decreasing; midnight, 29.87, sea still high and irregular; 13th, 4 a. m., NNW., moderate wind, and sea decreasing; 9:30 a. m.,  $45^{\circ} N. 42^{\circ} W.$

The following is a short account of a severe storm encountered by U. S. S. *Scatarra*, off the east coast of Nippon, August 25th and 26th, 1880:—August 25th, noon,  $37^{\circ} 19' N. 141^{\circ} 30' E.$ , barometer 29.79 falling, wind S. by W., force 3; 6 p. m., 29.72, S. 6, rough sea; 9 p. m., 29.66, S. by E. 7; 10 p. m., 29.62, SSE. 7 to 8, ran ship to NNE.; 11 p. m., 29.58, SE. by S. 7 to 8, light rain; midnight, 29.54, SE. 9, in heavy squalls, the wind gradually backing around to SW. and blowing a strong gale, force 9 to 10; 26th, 4 a. m., 29.44, after which barometer rose steadily and wind gradually decreased; noon, 29.65, SW. 6 to 7, heavy sea. The report adds:—"The storm traveled southward and westward and then turned and went to the northward and eastward." During the passage of this storm the following observations were made at the U. S. Naval Hospital at Yokohama, Japan; August 24th, 7:35 a. m., Washington mean time, (10 p. m. local,) 29.79, SW. 6, cloudy; 25th, same hour, 29.49, SW. 8, squally and rainy, rainfall 0.84 inch.; 26th, same hour, 29.74, calm and clear.

Upon chart No. V are shown for the month of *January*, 1879, the mean pressure, mean temperature, mean force and prevailing direction of winds at 7:35 a. m., Washington mean time (0:43 p. m. Greenwich mean time) for the northern hemisphere, and at a few stations in the southern hemisphere. In America *northwesterly* winds generally prevailed; in Europe they were from *northeast* to *southeast*, except in Spain and Portugal, where they were *southwesterly*; in Algeria they were *northwesterly*; in Asia, *calms* or light *easterly* winds prevailed in Siberia; *north* winds along the eastern coast, and *northerly* winds in India; over the Atlantic ocean, north of parallel  $40^{\circ}$  and east of  $40^{\circ} W.$ , *southwesterly* winds prevailed, while to the eastward of the meridian named they varied from *northwest* to *southwest*; these winds were particularly strong between parallels  $40^{\circ}$  and  $50^{\circ}$  and meridians  $30^{\circ}$  and  $50^{\circ}$ . High pressures (30.20 inches, or 767.1 mm., and above) covered in Asia, the interior of that continent; in Europe, the greater part of Russia; in America, (the United States) the South Atlantic and Gulf States, the Ohio and Lower Missouri valleys and a portion of the Oregon coast. Over the Atlantic ocean a narrow belt of high pressure between latitudes  $20^{\circ}$  and  $35^{\circ}$ , extended from  $45^{\circ} W.$ , northeastward to the African coast. Low pressures (29.80 in., or 756.9 mm. and below) covered the greater part of the Atlantic ocean north of latitude  $40^{\circ}$  and west of longitude  $15^{\circ} W.$  Comprised within this area were Iceland, Greenland, and the Canadian Maritime Provinces. An undefined area of low pressure also existed over Behring's sea. The highest mean pressure prevailed at Barnaul, Siberia, 30.50 or 774.8 mm.; the lowest, at Godthaab, 29.36, or 745.8. Of barometric readings the highest noted was at Barnaul, Russia, on the 19th, 795.5 mm., or 31.32 inches. The lowest 703 mm., or 27.68 inches, (reported to the *Deutsche Seecarte*,) was made on the BERG, in  $59^{\circ} N. 24^{\circ} W.$ , 10 p. m., 17th, from a *reliable aneroid*. The lowest land pressure was at St. Paul's Island, Behrings Sea, where a most unusual monthly range occurred from 27.987 inches or 710.9 mm. on the 1st, to 30.462 or 773.7 on the 18th. While very low temperatures prevailed as usual over the interior of Asia, yet the lowest mean occurred at York Factory— $28.8^{\circ} F.$ , or  $-33.8^{\circ} C.$  The lowest temperature noted during the month was on the 20th at Barnaul, Russia,  $-49.4^{\circ} C.$ , or  $-56.9^{\circ} F.$  In general, an excess of barometric pressure, with corresponding deficiency of temperature prevailed over the British Isles and the greater part of the United States. As compared with the chart of similar means for January, 1878, lower pressures, and in general, higher temperatures are found in Algeria, Belgium, and the greater part of France, Portugal, Spain, and the northeastern part of Canada. The following differences are noted: *Algeria*, Geriville  $-0.24$  in.,  $+6^{\circ}$ ; *Belgium*, Brussels,  $-0.13$ ,  $+6^{\circ}$ ; *France*, Clermont Ferrand,  $-0.29$ ,  $+6^{\circ}$ ;

*Azores*, Angra,  $-0.24$ ; *Spain*, Bilboa,  $-0.35$ ,  $+6.02$ ; *Canada*, Sydney,  $-0.25$ . Higher pressures and lower temperatures are found in the British Isles, Norway, Russia, Sweden, the United States, and Hudson Bay Territory. The most notable changes are: *British Isles*, Sandwick,  $+0.16$  in.,  $-5.04$ ; *Norway*, Bronø,  $+0.40$ ,  $-2.05$ ; *Russia*, Moscow,  $+0.44$ ,  $-4.01$ ; *Sweden*, Haparanda,  $+0.44$ ,  $+0.02$ ; the *United States*, Roseburg,  $+0.28$ ,  $-7.0$ , Pembina and Chicago,  $-12.0$ . *Hudson Bay Territory*, York Factory,  $+0.08$ ,  $-18.06$ . In general, since the preceding month (*December*, 1878), the mean pressure has greatly increased over Europe and the Atlantic ocean east of  $30^{\circ}$  and south of  $40^{\circ}$ . The greatest increase of pressure occurred over Norway and Sweden; Haparanda, Hernosand and Stockholm,  $+0.56$  in. The most decided diminution was over the northwestern Atlantic, Heart's Content  $-0.16$ ; Stykkisholm,  $-0.42$  and Godthaab,  $-0.57$ .

On chart No. VI are traced the paths of 33 of the principal storm-areas of the northern hemisphere, during the month of *January*, 1880. Of these, four, Nos. IX, XX, XXIV and XXXII, are located along the eastern coast of Asia; seven, Nos. II, XII, XVII, XVIII, XXVIII, XXIX and XXXI, over the Behring's Sea region, and the rest, 22 in number, over the North American and European continents and North Atlantic Ocean. Thirteen of the last first appeared over or in the neighborhood of North America, of which six were already well developed areas when first noticed over Washington Territory or Manitoba. All of the American storms can be traced for some distance off the eastern coast, moving in an easterly or northeasterly track over the western portion of the Atlantic, but it is only possible to carry three, Nos. XI, XVI and XXIII, over to the European coast. Striking similarities occur in the paths of these three storms, notably, the southeasterly paths of areas Nos. XVI and XXIII, from the centre of the ocean to the Mediterranean. Five storms, Nos. I, IV, XIII, XIV and XVI, appear to have originated over the Atlantic, but the development of these is intimately connected with areas of low pressure preceding and to the northwest of their places of origin. All the European storms, with the exception of area No. X, came from the ocean.

The four tracks shown along the eastern coast of Asia are those of unusually well-defined areas, both as regards their extent and their progressive motion. Of the four, the one designated as No. XX was the best marked, and a short description of it will serve to point out the general characteristics of the whole as a class. The following table shows the lowest barometric readings observed, with the time of observation reduced to Washington mean time, and the direction of wind at the time of lowest barometer and at the next preceding and succeeding observations:

STATIONS.	Date.	Washington mean time.	Barometer.	Winds.
	<i>January.</i>	<i>h.m.</i>	<i>Inches.</i>	
Nertschinsk.....	13th	8:43 p. m.	30.21	Calm—Calm—(—)
Pekin.....	15th	7:35 a. m.	30.04	Calm—Calm—NW.
Tientsin.....	14th	7:35 a. m.	29.99	SE—Calm—SSE.
Macao.....	14th	7:35 a. m.	30.05	NE.—ESE.—E.
Shanghai.....	14th	2:46 p. m.	29.94	SE.—S.—S.
Nagasaki.....	14th	7:42 p. m.	29.84	SE.—SSW.—W.
Hiroshima.....	15th	1:52 a. m.	29.71	NE.—(—)—N.
Yokohama.....	15th	7:35 a. m.	29.66	Calm—SW.—WSW.
Tokio.....	15th	5:28 p. m.	29.45	NNW.—NNW.—WNW.
Vladovostok.....	15th	5:04 p. m.	29.94	N.—N.—N.
44° N. 166° E.....	16th	7:35 a. m.	30.07	Variable—S.—S.
Nikolaievsk.....	17th	4:28 p. m.	29.64	NW.—W.—W.

At Peking the barometer on the morning of the 14th read 30.07, and on the 15th was evidently rising rapidly, as on the morning of the 16th the barometer reading was 30.47. The difference in the time of lowest barometer at Yokohama and Tokio is due to the fact that at the former station there is only one daily observation reported. The lowest barometric readings of the month at Tientsin, Shanghai, Nagasaki, Hiroshima, Yokohama, Tokio, Vladovostok, (except 29.90 on the 4th) and Nikolaievsk on the Amoor, occurred during the passage of this area. The average progressive velocity of the centre was about 25 miles per hour, which was probably about the same as that of the other areas.

## TEMPERATURE OF THE AIR.

The mean temperatures for September, 1880, are shown by isotherms on chart No. II. East of the Rocky Mountains an excess of temperature has prevailed in New England, Canada, Lower Lake region and Middle States. In the Missouri and Upper Mississippi valleys and Upper Lake region the mean temperature was normal. Elsewhere deficiencies were reported—the greatest in Texas. Westward of the Rocky Mountains the temperature has been normal or above, to the north of parallel 42, while to the south deficiencies have been reported. That at San Diego— $3.06$ —being the greatest departure from the normal in the country.

The following extracts relating to the temperature of the month are noted as of interest:

Riley, Ill., mean temperature  $2^{\circ}$  below average of 19 years; Gardiner, Me., temperature  $2.01$  above mean of 44 years; Westborough, Mass., mean temperature  $7^{\circ}$  above that of August; Linden, N. J., no frost during month; Newark, N. J., temperature  $5.09$  above mean of 37 years; Philadelphia, temperature  $6.09$  above mean of 91 years; Baltimore, 5th, two fatal sunstrokes.